(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization

International Bureau





(43) International Publication Date 10 September 2004 (10.09.2004)

PCT

(10) International Publication Number WO 2004/077729 A3

(51) International Patent Classification7: G08C 17/02, G07C 9/00

(21) International Application Number:

PCT/US2004/005257

- (22) International Filing Date: 23 February 2004 (23.02.2004)
- (25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

60/448,993

21 February 2003 (21.02.2003)

- (71) Applicant (for all designated States except US): JOHN-SON CONTROLS TECHNOLOGY COMPANY [US/US]; 650 Waverly, Holland, Michigan 49423 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): BLAKER, David, A. [US/US]; 557 Bay Avenue, Holland, Michigan 49423 (US). VREDEVOOGD, Loren, D. [US/US]; 869 Maywood Avenue, Holland, Michigan 49424 (US).
- (74) Agent: TIBBETTS, Jean, M.; Foley & Lardner, 777 East Wisconsin Avenue, Suite 3800, Milwaukee, Wisconsin 53202-5306 (US).

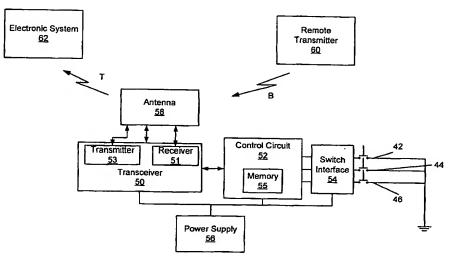
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE,

[Continued on next page]

(54) Title: TRAINABLE REMOTE CONTROLLER AND METHOD FOR DETERMINING THE FREQUENCY OF A LEARNED CONTROL SIGNAL



(57) Abstract: A trainable transceiver for learning signal characteristics of an RF control signal received from a remote control transmitter used to remotely actuate a device and for subsequently transmitting a modulated RF signal having the learned signal characteristics includes an antenna, a wideband receiver and a control unit. The wideband receiver is coupled to the antenna and is configured to receive an RF control signal from the remote control transmitter. The RF control signal includes a control code, a set of data characteristics and an RF carrier frequency. The control circuit is coupled to the wideband receiver and has a training mode in which the control circuit is configured to identify and store the control code of the RF control signal, to identify at least one data characteristic from the set of data characteristics and to identify at least one RF frequency associated with the RF control signal based on the at least one data characteristic.



EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

 as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments
- (88) Date of publication of the international search report: 4 November 2004

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

In tional Application No PCT/US2004/005257

A. CLASS	SIFICATION OF SUBJECT MATTER		. 017 00200 17 000207			
IPC 7	G08C17/02 G07C9/00					
According	to International Patent Classification (IPC) or to both national cl	assification and IPC				
B. FIELDS SEARCHED						
IPC 7	documentation searched (classification system followed by class $608C - 607C$	sification symbols)				
Documenta	ation searched other than minimum documentation to the extent	that such documents are inclu	ded in the fields searched			
Electronic data base consulted during the international search (name of data base and, where practical, search terms used)						
EPO-In	iternal, WPI Data	ата базе ало, мпете ргасясац	search terms used)			
C. DOCUM	ENTS CONSIDERED TO BE RELEVANT					
Category °	Citation of document, with indication, where appropriate, of t	ha ralayant necesage				
		lie Leievani hassades	Relevant to daim No.			
Х	US 6 181 255 B1 (FARRIS BRADFO 30 January 2001 (2001-01-30)	ORD L ET AL)	1-3, 5-11,			
Υ	column 8, line 57 - column 11, column 12, line 25 - column 14	line 20 , line 33	13-23 4,12			
X	US 5 854 593 A (DYKEMA KURT A 29 December 1998 (1998-12-29)	ET AL)	24			
Υ	column 5, line 51 - column 6, line 27 column 7, line 16 - line 51 column 16, line 48 - column 18, line 67		4,12			
		•	1.			
) ·			
}			·			
<u> </u>	er documents are listed in the continuation of box C.	X Patent family me	embers are listed in annex.			
	egories of cited documents :	"T" later document publis	hed after the International filing date			
Conside	nt defining the general state of the art which is not ered to be of particular relevance	or priority date and r	not in conflict with the application but the principle or theory underlying the			
filing date "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to						
which is cited to establish the publication date of another citation or other special reason (as specified) "Y" document of particular relevance; the claimed invention						
Other M	O' document referring to an oral disclosure, use, exhibition or other means Cannot be considered to involve an inventive step when the document is combined with one or more other such document is combined with one or more other such documents.					
iales tita	nt published prior to the international filing date but an the priority date claimed	in the art. "&" document member of				
Date of the a	ctual completion of the international search		International search report			
	September 2004	07/09/200				
Name and malling address of the ISA European Patent Office, P.B. 5818 Patentiaan 2 NL - 2280 HV Rijswijk		Authorized officer				
Tel. (+31–70) 340–2040, Tx. 31 651 epo ni, Fax: (+31–70) 340–3016		Pham, P				

INTERNATIONAL SEARCH REPORT

Information on patent family members

In tional Application No PCT/US2004/005257

6.1				
Patent document cited in search report	Publication date	Patent family member(s)		
US 6181255 B1	30-01-2001	NONE		
US 5854593 A	29-12-1998		93 A ,B 11-02-1998 15 A ,B 19-08-1998	